NATIONAL RADIO ASTRONOMY OBSERVATORY

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Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Office of Engineering and Technology declares	)	
Multispectral Solutions, Inc request for a waiver of	)	ET Docket No. 06-103
Part 15 to be a 'permit-but-disclose' proceeding	)	
for *ex parte* purposes (DA 06-1025)	)	

Comments of the
National Radio Astronomy Observatory
Charlottesville, VA 22903

I. Introduction

1. The National Radio Astronomy Observatory (NRAO) is pleased to provide comments responding to the request by Multispectral Solutions, Inc. (MSSI) for a waiver of Part 15 of the Commission's rules to permit a 12.75 dB increase in the peak power for transmitters operating under Section 15.250 in the 5925-7250 MHz band.

2. NRAO (http://www.nrao.edu), operated by Associated Universities, Inc., (http://www.aui.edu) under a cooperative agreement with the National Science Foundation, is the largest radio astronomy observatory and one of the largest astronomical observatories of any kind in the world. It operates more than one dozen radio astronomy stations in rural areas of the United States, many of which stand to be affected by any change in the Commission's rules for the operation of unlicensed devices employing UWB technology.

3. NRAO opposes the waiver request for reasons which are described below in Sections II and III, and summarized in Section IV. NRAO is especially concerned that the intended use of the MSSI device as an RFID tag on livestock is contrary to the Commission's restrictions on outdoor use of devices employing UWB technology. Such use would remove one of the primary means by which radiotelescopes are protected against interference which may be generated by these devices.

II. Restricted Outdoor Use of Unlicensed Devices Employing UWB Technology

4. To demonstrate compliance with the Commission's rules, MSSI submitted a test report from Met Laboratories, Inc., which is available on the MSSI website. Section 3.4 of this report, titled 'Operational Restrictions' begins "**Test Requirements: §15.250(c): Technical Requirements for indoor UWB systems.** Operation under the provisions of this section is limited to UWB transmitters employed solely for indoor operation." The report then quotes text from Part 15.217 of the Commission's rules regarding what constitutes indoor use. Part 15.250 reads in part

"Except for operation on board a ship or a terrestrial transportation vehicle, the use of a fixed outdoor infrastructure is prohibited."

5. The waiver request discusses the intention of MSSI to market its device as an active RFID tag for livestock under the National Animal Identification System (mistakenly referenced as the 'National American Identification System'). Many of the NRAO telescopes, but especially the Very Large Array (VLA) and the Robert C. Byrd Green Bank Telescope, are surrounded by large quantities of livestock grazing, penned, etc. From the point of view of the NRAO operations, there is no difference between deployment of this device on these livestock and deployment "on a fixed outdoor infrastructure."

6. Limitation to indoor use is one of the primary means by which NRAO instruments may be separated from and protected from interference by unlicensed devices employing UWB technology. NRAO is deeply concerned that their deployment as RFID tags on livestock would deny such protection and is in fact impermissible under the Commission's rules. NRAO exhorts the Commission most strongly to clarify that this is the case.

III. Higher Power Operation of Devices Employing UWB Technology under Part 15.250

7. NRAO opposes the waiver request for higher power operation of the MSSI device. No supporting technical justification is provided for the need to operate at higher power, only the vague statement that "It has been determined that an additional 12.75 dB in peak power is adequate to permit effective and reliable operation." The supposed need for higher power operation could arise from any number of reasons, including maladroit supporting technical implementation, which should not be addressed by a waiver request.

8. MSSI requests a change in only one aspect of the rules, namely +12.75 dB higher *peak* power operation. As tested, the peak power of the MSSI device was determined over a 1 MHz bandwidth. With UWB, it should be the broadband *average* EIRP which determines the range and effectiveness of a device. The Met Laboratories test results, cited in the waiver request, provide insight into this paradox; the MSSI device has 6.5 dB margin with respect to the requirements for average EIRP, but only 1.2 dB with respect to the peak. That is, unevenness of its emission spectrum forces the device to operate 5.3 dB below the permitted mean EIRP level, so that the requirement on peak power is not violated. This aspect of the device operation should be addressed by redesign, not by a waiver of the rules.

9. It seems likely that the MSSI device would violate the limits on mean EIRP if it were to operate such that its peak EIRP exceeded the current limit by 12.75 dB, and perhaps with substantially less added headroom. The device must be retested for compliance if operation at such levels is intended.

10. In its waiver request MSSI notes that the permitted levels of peak EIRP in Part 15, particularly Parts 15.35(b) and 15.209, are sometimes expressed as "20 dB above the maximum permitted average emissions limit," in this case -41.25 dBm/MHz + 20 dB = -21.25 dBm/MHz. Expressed over 50 MHz this becomes -21.25 dBm/MHz + 17 dB = -4.25 dBm/50MHz. By contrast, the peak EIRP limit in Part 15.250 is 0 dBm/50 MHz, which is higher (more generous) by 4.25 dB.

11. In the waiver request, MSSI asserts that the general Part 15 limit on peak EIRP, imported into Part 15.250 in the supposed absence of bandwidth desensitization correction, would be -21.25 dBm/MHz + 2 x 17 dB = 12.75 dBm/50 MHz. This calculation is in error, and it is the existing, already somewhat more generous limit for Part 15.250 which should apply, that is, 0 dBm/50 MHz.

IV. Summary of Concerns

12. NRAO concerns, detailed in the preceding paragraphs, may be summarized as follows:

    a. If FCC restrictions on outdoor use of unlicensed devices employing UWB technology are to be respected, the use of UWB RFID tags on livestock outdoors is disallowed. Permitting outdoor deployment would remove one of the primary means by which NRAO's stations are protected from interference.

    b. No appropriate technical justification was provided by MSSI in its waiver request. It appears that the MSSI device is innately constrained to operate well below the existing mean EIRP limit and this impediment should be addressed by the manufacturer before a waiver request is considered by the Commission.

    c. If the MSSI device is to operate at higher peak EIRP than that at which it was certified, it should be retested to demonstrate compliance with other requirements, such as the mean EIRP, for which no waiver has been sought.

Respectfully submitted,

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